Third United Nations International Conference on the Peaceful Uses of Atomic Energy

A/CONF.28/A/808
SWEDEN
February 1964
Original: ENGLISH

Confidential until official release during Conference

Abstract

Fuel Handling Equipment for the Ågesta D_2O Moderated Pressure Vessel Reactor

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The subject of the report is to give some aspects of the philosophy and the experience of design, manufacture and tests.

Certain basic parameters were stated for the design. The fuel handling has to be carried out under gastight and radiation protected conditions, the fuel handling machine and the fuel storage must be provided with an effective cooling system for all conceivable running conditions, the manoeuvering system must be fool-proof and finally, the D_2O condensate in the charge machine has to be collected and prevented from mixing with H_2O.

In order to make the design as simple as possible, it was decided to use a joint charge pipe for the four closest element positions. The charge pipe also contains the control rod which is serviced by the charge machine. The fuel elements hang from hooks below the reactor lid and are handled by means of a fork-grab located in the fuelling machine.

The fuel store is in the form of tanks, which are normally kept below atmospheric pressure to prevent activity leakage into the reactor hall. During fuelling, which is carried out in the "off-load"condition, the charge machine is connected, gastight, to the charge pipe in the reactor as well as to those in the fuel store.

The D_2O in the system is collected by draining the cooling gas. The condensate from the dryer is led to a special condenser tank. Any mixing of H_2O

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is prevented by thoroughly exhausting the charging pipe and fuelling machine before any charging is carried out.

Each operation is started and stopped manually. To make the system foolproof interlocks are used and manual overriding is provided on all basic operations.

The request for limiting the choice of construction materials and the stipulation for high cleanliness during manufacture has raised certain complications. The wish to keep down the dimensions has also necessitated designs which have caused certain manufacturing problems.

After necessary corrections during the final erection and tests it was shown that all functions corresponded well with the estimated design performance.